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BIOLOGICAL EVALUATION OF ROOT TIP WEEVIL ON THE HURON-MANISTEE NATIONAL FORESTS

By Imants Millers, Entomologist

A. INTRODUCTION

The Root Tip Weevil is a serious pest of red, jack and Scotch pines. The larvae tunnel the roots, from the extremities toward the base, and destroy root absorption capacity. The ensuing symptoms are flagging, stunting and eventual death of the tree.

Outbreaks in Michigan occur in 6 loci covering about 680 acres. Additional, immediate susceptible type exceeds 2,000 acres, but over 10,000 acres are potentially threatened.

Meager information is available on the pest, but indications are that shallow root systems associated with sandy soils, depleted by agriculture or severe burning, are the basic requirements for outbreaks. The following action is recommended:

1. Systematic survey to evaluate the problem.
2. Gather all available information on the weevil.
3. Determine timber management changes needed and consider the implementation of the practices.

B. TECHNICAL INFORMATION

1. Causal Agent:

   Hylobius rhizophagus Millers, The Root Tip Weevil

2. Hosts:

   Pinus resinosa Ait., The Red Pine

   Pinus banksiana, Lamb. The Jack Pine

   Pinus sylvestris L, The Scotch Pine

3. Type of Damage:

   The damage occurs when weevil larvae tunnel through the roots. The particular habit of first entering at the root terminal portions and then working toward the basal parts results in the greatest damage from feeding root destruction.

   The red pine first shows "flags", i.e. single branch mortality when only few roots are destroyed; however, eventually the whole tree may be killed.

   The jack pine appear to be more resistant to weevil damage symptoms, and the earliest signs of decreased vigor appear

when considerable root damage has already occurred. Frequently, stand losses are obvious when weevil is first detected. However, the scattered red pine within jack pine are early indicators of weevil activity.

The Scotch pine is very vulnerable to weevil damage. Flagging and mortality appears early.

4. Biological Data:

The destructive powers of this pest are very great, particularly since control methods applicable to the forest environment are not available. Population level fluctuations occur, but the causal factors are not known. Similarly, quantitative evaluation methods are not available. Population levels may be estimated on basis of recent root damage, and the abundance of adult feeding scars on twig bark.

5. Physical Data:

The environmental conditions that favor outbreaks are not well known. During the writer's encounters with the weevil, certain conditions appeared favorable.

Abundance of pine roots in the upper foot of soil appears necessary. Deeper roots may not be accessible to the adult weevils because of oxygen deficiencies. Generally, sandy soils support outbreak populations. In Wisconsin, most outbreaks were located in jack pine stands growing on former agricultural soils. However, in Michigan outbreaks the soils have been always forested. Apparently, the severe fires in early 1900's produced similar soil conditions that favor root growth near soil surface.

In Michigan, all weevil outbreaks are located in association with jack and scotch pines. However, the greatest damage occurs on the more valuable red pine.

The more important losses occur where red pine was underplanted to lightly stocked older jack pine. The younger red pine are eliminated in these situations, while the jack pine do not show any ill effects. While the outbreak loci are few, the practice of planting red pine under jack pine is wide spread. This could intensify future problems with the root tip weevil.

6. Location and Extent of Outbreaks:

The infestation loci are shown on the attached Forest Maps. The extent of these loci are not known, and a ground survey is needed to determine the boundaries. The following acreage estimates are available:

	INFESTATION		AREA IN ACRES	
FOREST	T.	R.	KNOWN	SUITABLE TYPE
Manistee	17N	12W	40	1,000
	13N	11W	15	100
Huron	25N	1E	5	600+
	25N	3E	10	600+
	25N	7E	600	600+
	26N	4E	10	100
		TOTAL	680	2,000+

It should be emphasized that not all the trees in the infested area are dead or will die. However, reduced growth, and perhaps commercial loss of the stand are within the realm of possibility. In addition, the suitable type considered here is that occurring within a mile from the outbreak locus. However, mixed jack and red pine stands occur over more than 10,000 acres on the Huron National Forest.

C. DISCUSSION AND RECOMMENDATION

The Root Tip Weevil is a serious pest in Wisconsin, and appears to have a potential to develop in serious outbreak on the Huron-Manistee National Forest. Current 6 infestations are estimated at 680 acres, with additional 2,000 acres suspected. The future spread of the problem is limited by the type conditions, however, more than 10,000 acres of jack-red pine type could become infested.

The damage occurs from larval tunnelling and destruction of root systems. The damage is most severe on red pine, but the pest appears in outbreak only when jack or Scotch pine are present.

The lack of economical control methods emphasizes the importance of prevention. The meager information on weevil biology indicates that mixtures of red and jack pine are not desirable. Overall, the problem requires serious reconsideration of silvicultural practices.

The following recommendations are set forth for the next year:

1. Systematic detection survey should be set up to determine the extend of root tip weevil presence.

2. Gather all the available information on the problem from Wisconsin, where the outbreaks have occurred for the past decade.

3. Determine what timber management changes are needed and discuss the feasibility of these changes with timber management specialists.

D. LITERATURE

MILLERS, I. and BENJAMIN, D. M., 1961. A new Hylobius problem in jack pine plantations. Proceed. North Central Branch, E. S. A. 16:88-89.

MILLERS, I., BENJAMIN, D. M., and WARNER, R. E., 1963. A new Hylobius weevil associated with jack pine stand deterioration (Coleoptera: Curculionidae) Canad. Entom. 95 (1):18-22.

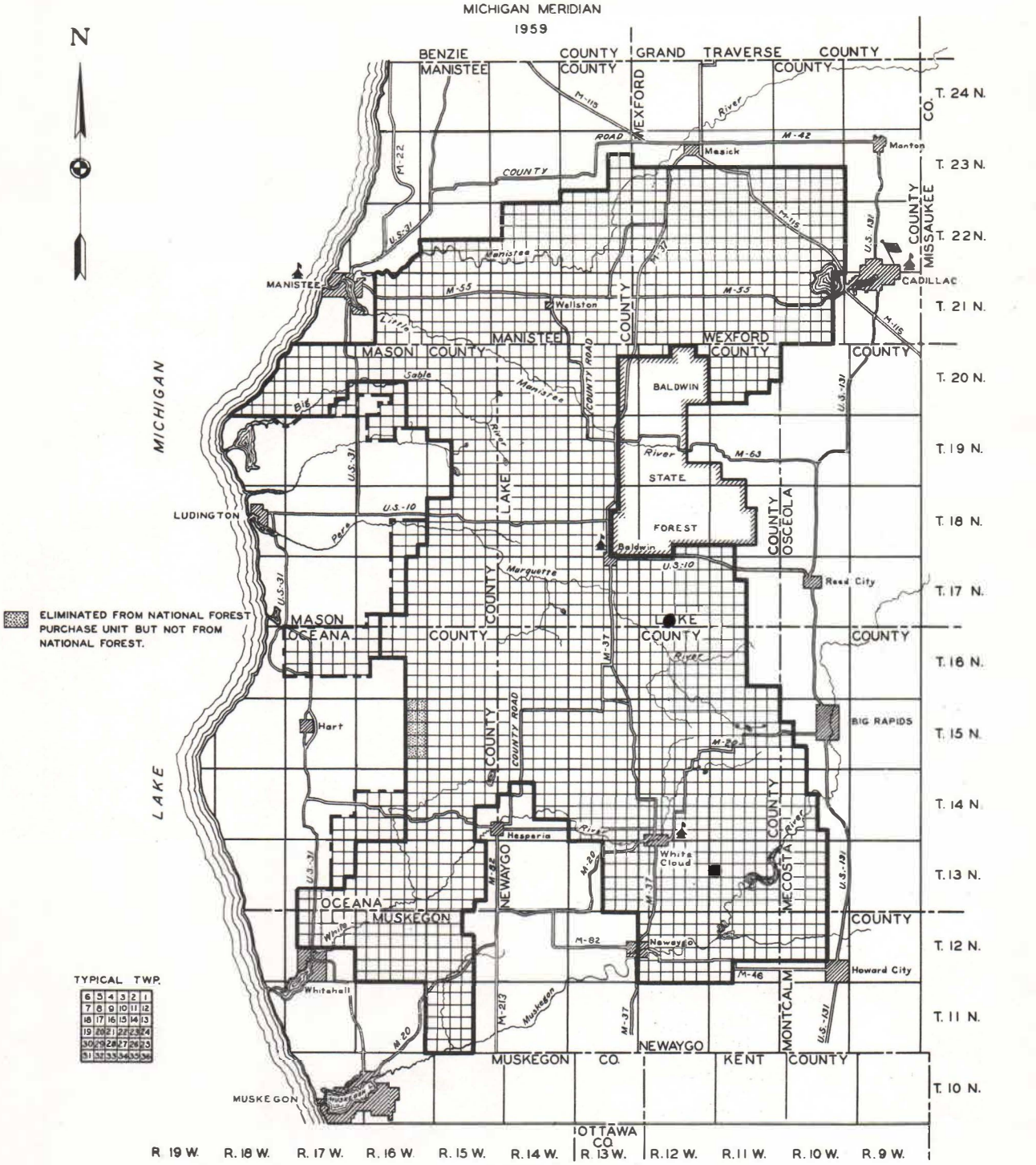
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION 9

MANISTEE NATIONAL FOREST
AND
PURCHASE UNIT

MICHIGAN

MANISTEE, WEXFORD, MASON, LAKE, OCEANA, NEWAYGO,
MECOSTA, MUSKEGON, AND MONTCALM COUNTIES

MICHIGAN MERIDIAN
1959



ELIMINATED FROM NATIONAL FOREST PURCHASE UNIT BUT NOT FROM NATIONAL FOREST.

TYPICAL TWP.

6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	
19	20	21	22	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

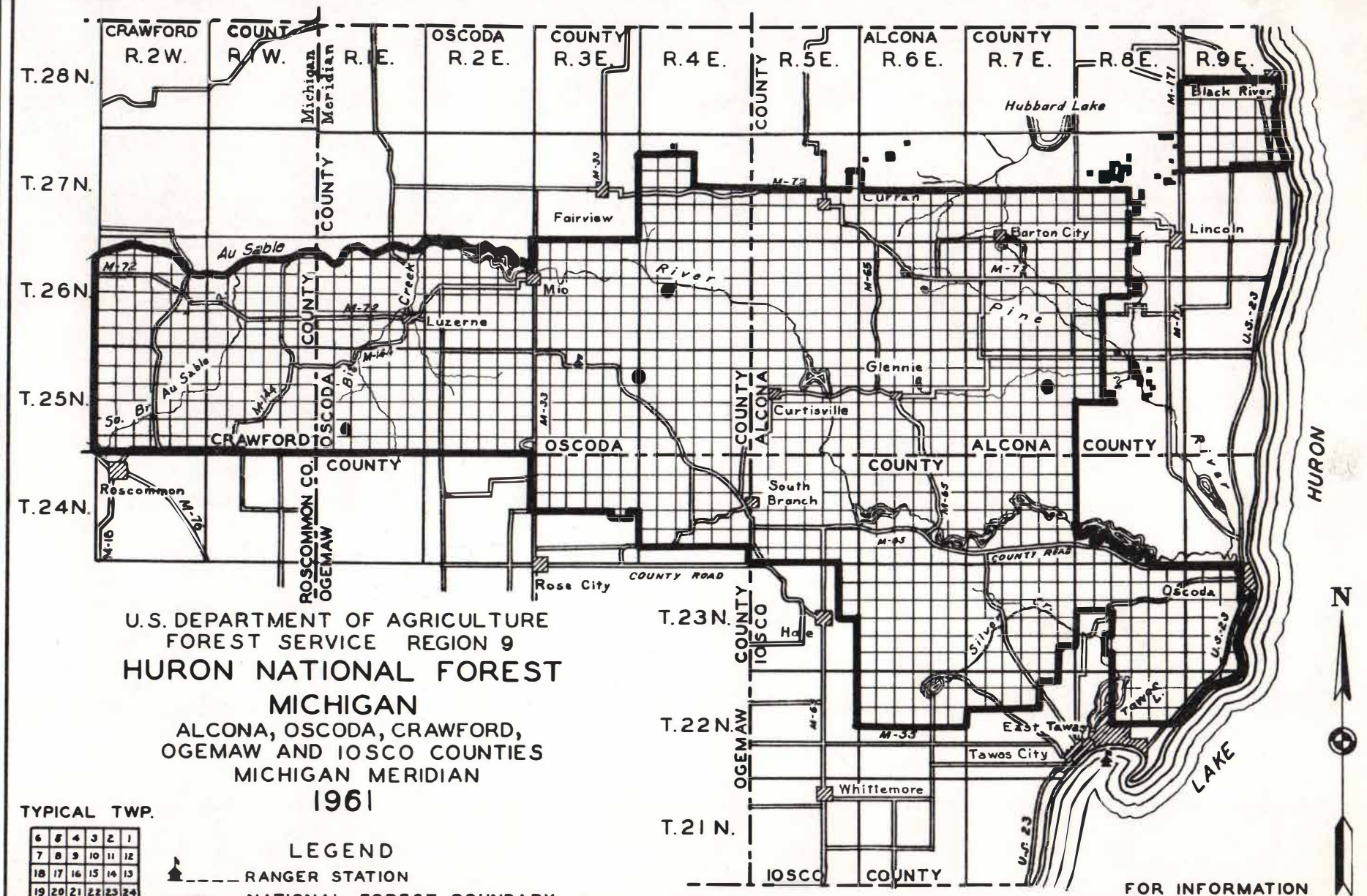
LEGEND
- RANGER STATION
- SUPERVISOR'S OFFICE
- NATIONAL FOREST BOUNDARY
- PURCHASE UNIT BOUNDARY
- MAIN HIGHWAYS

SCALE: ONE SMALL SQUARE EQUALS ONE SQUARE MILE.

FOR INFORMATION CONTACT
FOREST SUPERVISOR
U.S. FOREST SERVICE
CADILLAC, MICHIGAN

USDA-SCS-MILWAUKEE, WIS. 1959

● H. rhizophagus infestations



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION 9

HURON NATIONAL FOREST
MICHIGAN

ALCONA, OSCODA, CRAWFORD,
OGEMAW AND IOSCO COUNTIES
MICHIGAN MERIDIAN

1961

TYPICAL TWP.

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
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